


 DigitalClarity[®] Technology

3.1-Megapixel, 1/4-Inch CMOS Digital Image Sensor Camera System-On-a-Chip

Pictures Taken With Camera Phones Shouldn't Be a Blur

Features

- Motion-adaptive exposure mode
- Advanced 1.75 μ m pixel technology
- 3.1-megapixel resolution
- 1/4-inch optical format (4:3)
- 2048H x 1536V array format
- Dual-camera bridging support with MT9V013
- One-time programmable (OTP) memory
- Integrated real-time JPEG encoder
- 15 frames per second (fps), full resolution
- Flexible support for external auto focus, optical zoom, and mechanical shutter
- On-chip phase lock loop (PLL)
- Programmable I/O slew rate
- On-chip, 10-bit analog-to-digital converter (ADC)
- Two-wire serial interface providing access to registers and microcontroller memory
- 10-bit parallel, MIPI serial interface
- Micron[®] DigitalClarity[®] CMOS imaging technology
- Low-power, low-cost, progressive-scan CMOS image sensor

Small Size, Great Performance

Micron's 3.1-megapixel, 1/4-inch complete system-on-a-chip (SOC) image sensor for camera phones is the first in its class to incorporate a motion-adaptive feature to reduce the occurrence of blurred images caused by inadvertent movement of the camera. The MT9T111—which was developed using Micron's industry-leading 1.75 μ m pixel technology and features our exclusive low-noise DigitalClarity technology—provides best-in-class image quality while maintaining a small form factor.

Motion-Adaptive Feature

As mobile devices get smaller, it becomes more challenging for users to hold them steady enough to get a flawless shot. Micron's MT9T111 outputs sharp, clear, progressive-scan images while minimizing the effects of an unsteady hand or an attempt to take a picture of someone in motion. When the MT9T111 detects motion in the field of view, it automatically adjusts settings to greatly reduce image blur.

Crisp, Clear Benefits



Micron's motion-adaptive technology can make a vivid difference in camera phone image quality. This simple lab test shows images taken without (left) and with (right) this technology. The camera was rotated at 2 deg/sec, and the scene was lit at ~70 lux.

Applications

- Cellular phones
- PC cameras
- PDAs

Sophisticated Functionality

For basic operation, the innovative MT9T111 SOC image sensor requires only a power supply, lens, and clock source. Designers can simply plug and play. Its integrated real-time JPEG encoder is a highly integrated, high-performance solution that provides for low-power consumption and full programmability of JPEG compression parameters for image quality control. It also features an on-chip image flow processor that performs a host of image correcting and enhancing functions you'd normally need another part for.

The MT9T111 image sensor can be programmed to output progressive-scan images at up to 30 fps in preview/power-saving mode and 15 fps in full-resolution (QXGA) mode. In either mode, the image data can be output in any one of six 8-bit formats.

Specifications

• Pixel Size:	1.75µm x 1.75µm	• ADC:	10-bit, on-chip
• Array Format (Active):	2048H x 1536V (QXGA)	• Output Interface MIPI:	Single-lane
• Imaging Area:	3.62mm x 2.73mm: 4.52mm diagonal (4:3 aspect ratio)	• Parallel:	10-bit
• Targeted Module Size (estimated):	8.5mm x 8.5mm x 5mm	• Maximum Pixel Data Output:	48 megapixels per second
• CRA (tentative targets):	24.99° (Max at 80% image height)	• Maximum Data Rate:	96 MHz
• Color Filter Array:	RGB Bayer color filters	• Responsivity:	0.44 V/Lux-sec (preliminary)
• Optical Format:	1/4 inch (4:3)	• Signal-to-Noise Ratio:	>38dB (preliminary)
• Frame Rates:	15 fps (full resolution) (JPEG), 30 fps (preview mode)	• Dynamic Range:	>67.4dB (preliminary)
• Scan Mode:	Progressive	• Supply Voltage:	Analog: 2.5V–3.1V Digital: 1.70V–1.95V I/O: 1.7V–3.1V PLL: 2.5V–3.1V MIPI: 1.70V–1.95V
• Shutter:	Electronic rolling shutter (ERS)	• Power Consumption:	<150mW (@ 30 fps)
• Automatic Functions:	Exposure, white balance, black level offset correction, flicker detection and avoidance, color saturation control, defect identification and correction, and aperture correction	• Operating Temp:	-30°C to +70°C (at junction)
• Windowing:	Programmable to any size	• Package:	Bare die (in wafer form)

Low power consumption is an important requirement for all devices that go into mobile products. The MT9T111 has numerous power-saving features, including both hard and soft standby modes, as well as a PLL that can be bypassed and powered down to save power.

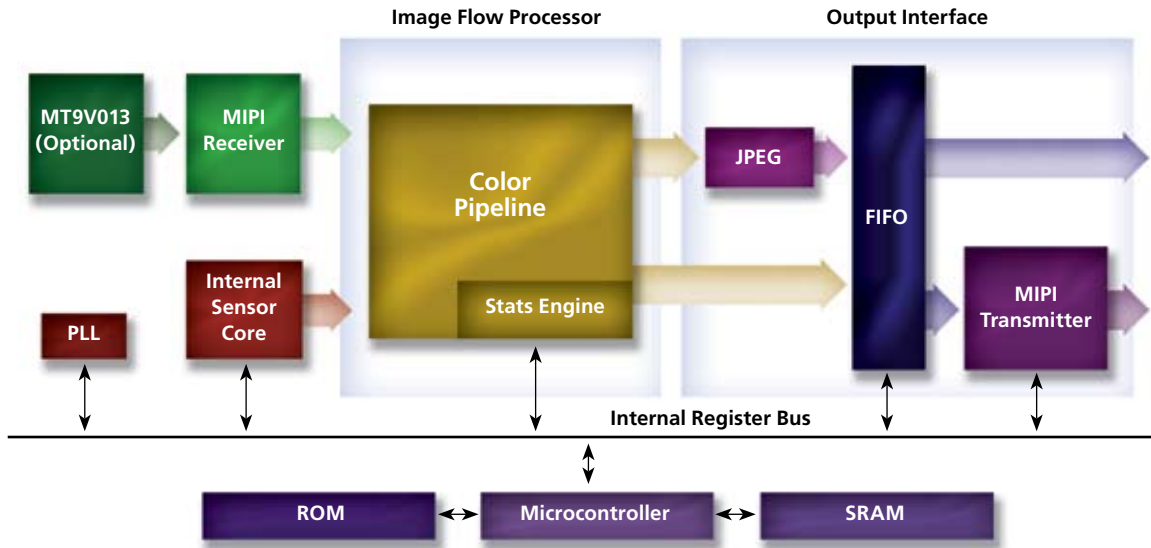
Micron's advanced CMOS imaging technology, featuring our breakthrough DigitalClarity technology, achieves CCD image quality (based on signal-to-noise ratio and low-light sensitivity) while maintaining the inherent size, cost, and integration advantages of CMOS.

Contact Micron

General customer sampling of the MT9T111 is planned for August, with mass production expected 4Q07. To order, call us at 208-368-3900 or visit us on the Web at www.micron.com/imaging.



Block Diagram



www.micron.com

Products are warranted only to meet Micron's production data sheet specifications. Products and specifications are subject to change without notice.

Micron, the Micron logo, and DigitalClarity are trademarks of Micron Technology, Inc. All other trademarks are the property of their respective owners. ©2007 Micron Technology, Inc. All rights reserved. 04/09/07 EN.L

